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A NOTE ON THE MOVEMENTS OF A FREE-RANGING MALE DOMESTIC CAT IN SOUTHWESTERN SPAIN

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RIASSUNTO – ***Nota sui movimenti di un gatto domestico maschio randagio nella Spagna sud-occidentale*** – Viene descritto il comportamento territoriale di un gatto domestico maschio randagio in un'area del Parco Nazionale di Doñana (Spagna sud-occidentale), rilevato con radio-tracking per un periodo di circa 4 mesi.

Key words: domestic cat, ***Felis catus***, field behaviour, radio-tracking, Doiiana.

Domestic cats, ***Felis catus***, have the ability to survive both in human environments (urban areas or farms; e.g. Liberg, 1980; Haspel and Calhoon, 1989) and in natural habitats (e.g. Konecny, 1987; Furet, 1989). Here, we describe the field behaviour of a male domestic cat living in Doiiana National Park.

The cat (3.62 kg of weight), radio-tracked between January 20, 1989 and May 30, 1989 at Coto del Rey (Doiiana National Park, southwestern Spain, approx. 37° 10' N, 6° 23' W), was trapped with a box-trap and equipped with a radio-collar containing a motion sensor. Nearly every day the cat was radio-located by approaching on foot (only 15 times we used triangulation), In most occasions it was possible to see the cat at a distance without disturbing him. For each location, we noted the position, activity, and type of habitat used. We also undertook two 12-hour periods of continuous tracking, one from 12.00 to 24.00 and the other from 24.00 to 12.00, locating the cat hourly.

Home range size and use were estimated, respectively, by the 100% minimum convex polygon method (Macdonald et al., 1980) and the Fourrier transformation (Anderson, 1982). Home range size appeared to be suitably estimated, as home range did not increase after 85 locations (Fig. 1).

We grouped activity data into four daily periods: night (from 20.00 to 04.00 h), day (08.00-16.00), dusk (16.00-20.00) and dawn (04.00-08.00). Habitat preference was calculated by Jacobs D index (Jacobs, **1974),** that ranges between values of **+1** (maximum preference) and **-1** (complete avoidance):

$$D = \frac{r - p}{r + p - 2pr}$$

where r is the proportion of use of a given habitat type, and p is its available proportion in the home range. Habitat availability was estimated from ground inspections and aerial photographs. Habitat use was separately analyzed for activity and resting (Palomares and Delibes, 1992). The following habitat types were distinguished (Fig. 2): **1.** Lentiscus: areas dominated by Pistacia ***lentiscus.*** 2. Rushes (***Juncus*** sp.). 3. Meadows: areas lacking cover. **4.** Eucalyptus: forested areas of Eucalyptus sp. 5. Allotments: small cultivated areas near country houses. 6. Matorral: scrubland dominated by ***Halimium halimifolium***. **7.** Marismas: flats usually flooded by winter rains. 8. Houses. **9.** Ash stands: clumps of *Fraxinus* sp.

The cat was born during summer 1987 and reared as a domestic animai at house A (Fig. 2). From one year old onwards he began to wander off (for successively longer periods) away from his natal house (V. Raposo, pers. comm.). Shortage of food and lack of care were never motives for the cat leaving house A. The cat was captured when 1.5 years old 1 km away from house **A.** Nearly every two weeks the cat visited house A during 1-3 days, and at the beginning allowing the owners to caress him, but gradually loosing tameness. The cat never kept contact with other people.

The cat home range included three houses (Fig. 2), and despite the large size **(689** ha), the areas of intensive use were around the three houses, and in particular house B (Fig. 3). This house was a large building inhabited by several families.

Houses, lentiscus and rushes were the habitats used most often for resting and activity (Table 1), and as a rule, habitat use was different from habitat availability (χ^2 = **939.76** and **281.04,** d.f. = **4** and 6, p, for activity and resting respectively). Preferred habitats were houses, lentiscus and rushes during resting and activity periods; the remaining habitats were

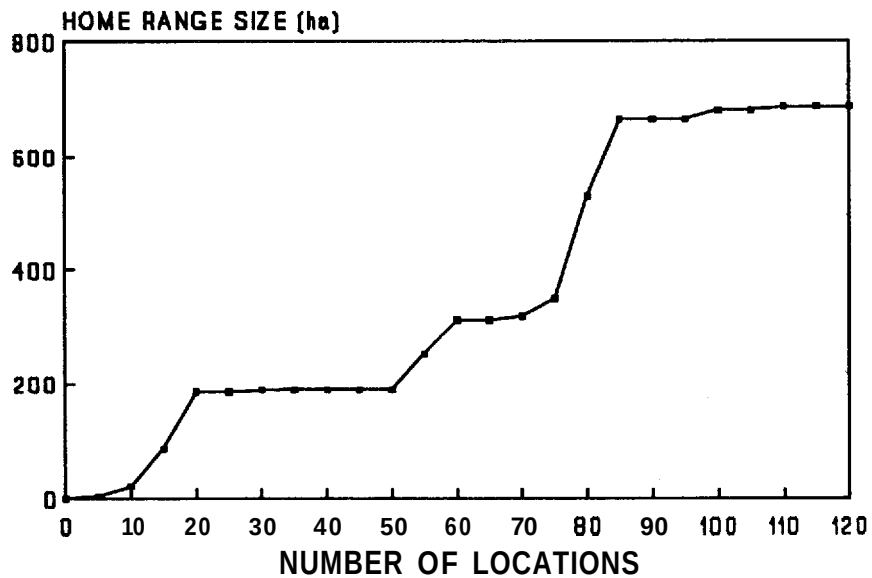

Fig. 1 – Relation between home range size and number of locations for an adult male domestic cat radio-tracked in Doñana National Park,

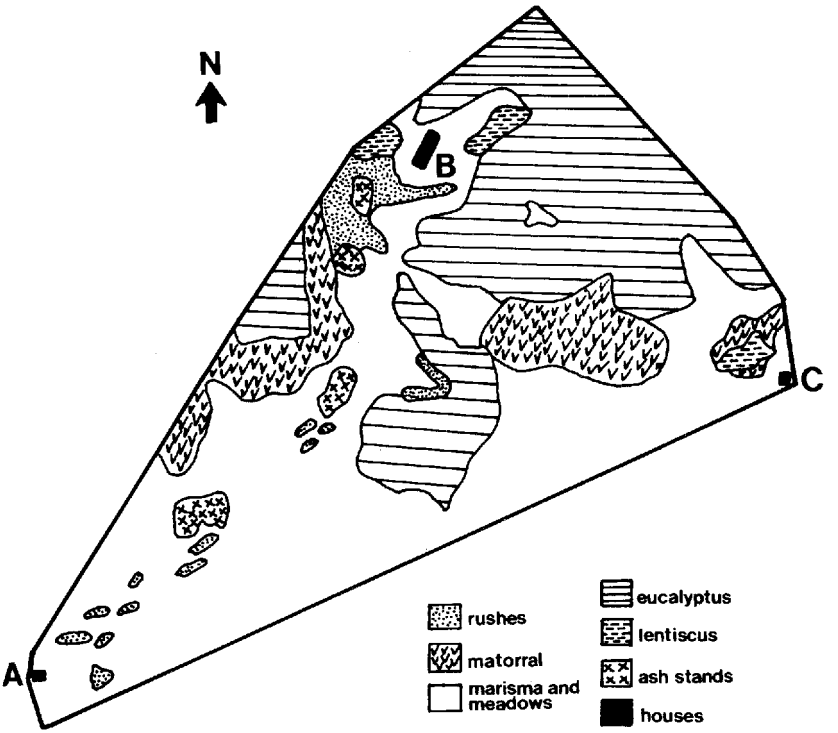

Fig. 2 – Habitat types inside the home range of an adult male domestic cat in Doiiana National Park.

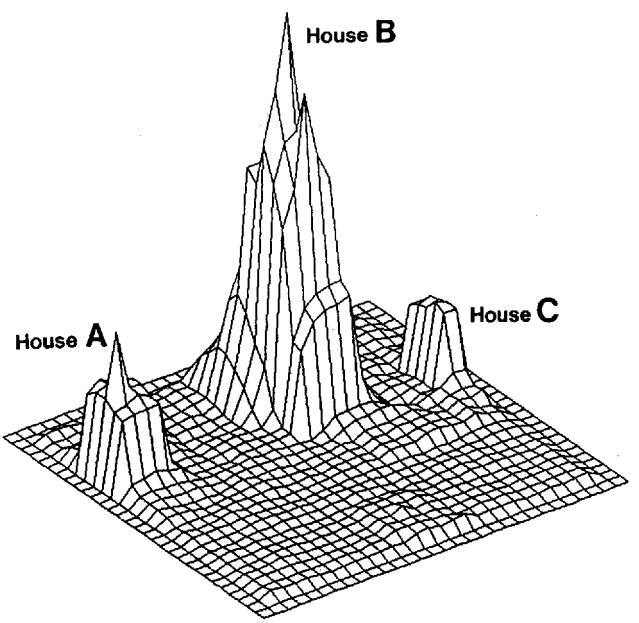

Fig. 3 – Areas of intensive use in the home range of an adult male domestic cat in Doiiana National Park.

Tab. 1 —Resting and activity habitat use for an adult male domestic cat. The values of Jacobs (1974) index (D) are given as well. D ranges between +1 (maximum preference) and -1 (complete avoidance).

	RESTING (N= 75)		ACTIVITY (N= 47)	
	PERCENTAGE	D	PERCENTAGE	D
Lentiscus	33.8	0.84	23.3	0.76
Rushes	12.2	0.49	14.9	0.29
Meadows	4.1	-0.59	8.5	-0.27
Eucalyptus		-1	4.3	-0.83
Allotments	1.3	0.13	-	-1
Matorral		-1	4.3	-0.27
Marismas		-1	6.4	-0.66
Houses	48.6	0.98	38.3	0.97
Ash Stands		-1	-	-1

avoided (Table 1). Most diurnal resting sites were in or very close to houses. Resting sites were further than 200 m from a house only 14.5% of occasions.

The cat was more often active at dusk, dawn and nightime than at daytime (night, 44% of the times, n = 13; dawn, 50%, n = 24; day, 24%, n = 88, and dusk, 69%, n = 44; χ^2 = 10.915, d.f. = 3, p = 0.0123). Activity pattern was similar to those previously described for both feral and domestic cats (Izawa, 1983; Panaman, 1981; Konecný, 1987).

When active, the cat usually remained close to the houses. Most locations (73.9%) were closer than 400 m from houses, and only 6.5% were further than 1000 m. On the two 12-hours tracking periods the cat stayed in house C in one, and moved at least 4,076 m around house B during the other.

The cat left his natal house, gradually fulfilling the behavioural conditions to be considered as a feral animal (McKnight, 1976, cited by Daniels and Bekoff, 1989).

Liberg (1980, 1984) argued that the most important factor determining the distribution of free-living cats are houses. Proximity to houses may reduce predation by and competition with the lynx, *Felis pardina*, as well as with the wildcat, *Felis silvestris*, which generally do not use areas near houses (J. F. Beltran, pers. comm.; J. J. Aldama, pers. com.). However, houses could also be frequented because female cats were present there. Groups of cats were living in the three buildings within the home range, and on 8-10 occasions we saw the cat together with females. An alternative hypothesis might be that the cat used houses for feeding in human-provided sites (which are commonly described in other studies of feral cats; e.g. Izawa et al., 1982). However, we were unable to detect feeding sites during the tracking.

Although range size can vary throughout the year, home range size was larger than others reported for feral and domestic cats (see Liberg and Sandell, 1988, for a review). This might be related to the large distance between houses within his home range, fitting the resource dispersion hypothesis (Macdonaid, 1983). If houses (and so females inhabiting them) are the resource determining male home range size (Liberg, 1980, 1984; Liberg and Sandell, 1988), greater dispersion of houses would lead to larger home ranges.

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